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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,487	09/02/2003	Hyung-Soo Kim	1349.1277	2312

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EXAMINER	
PHAM, HAI CHI	
ART UNIT	**PAPER NUMBER**
2861	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/652,487	KIM, HYUNG-SOO	
	Examiner	Art Unit	
	Hai C. Pham	2861	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,5,7-13 and 15-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,5,7-13 and 15-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL REJECTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 4-5, 7-13 and 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibe (U.S. 6,489,982) in view of McLaughlin et al. (U.S. 4,758,071) and Narisawa (U.S. 6,067,182).

Ishibe discloses a scanning optical system comprising a collimating lens (2) in which a beam emitted from a light source (semiconductor laser 1) is transformed into at least one of a convergent beam and a parallel beam with respect to an optical axis (col. 5, lines 46-50) and outputted towards a slit (aperture stop 3), the collimating lens having the following characteristics listed in Table 1 (col. 8):

- R1col = 182.212 mm (curvature radius of a first surface of the collimating lens opposing the light source, which is located *upstream* along the optical axis direction of the light beam)
- R2col = - 20.831 mm (curvature radius of a second surface of the collimating lens opposing the aperture stop, which is located *downstream* along the optical axis direction of the light beam)
- d3 = 6.00 mm (center thickness of the collimating lens)

- fcol = 24.636 mm (focal length from the collimating lens to the light source)

such that the following relationships:

R2col / R1col = 182.212 / (- 20.831) = - 0.114

and d3 / fcol = 6.00 / 24.636 = 0.12

amply satisfy the claimed inequalities.

However, Ishibe is silent regarding the collimator lens being made of one sheet of a spherical surface lens, the collimator lens being made of glass, and the first and second surfaces of the collimator lens having a first and a second positive constant refractive index, respectively.

McLaughlin et al. discloses a collimator lens (1) used in an optical reading or writing system, the collimator lens being made out of a sheet of a glass (glass plate 10, Figs. 9C-D) wherein either one surface or each of the two surfaces of the lens is processed into a spherical surface having a predetermined radius of curvature and a predetermined thickness (col. 4, lines 10-25), the spherical shape of the collimator lens is preferred over the aspherical shape because an accurate measurement would be required during the process of the latter. McLaughlin et al. further teaches the collimator lens having a first positive *constant* refractive index of 1.556 *at* its first surface and a second positive *constant* refractive index of 1.50 *at* its second surface (see Table 2A, Example 2).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the collimator lens in the device of Ishibe with a lens made out of one sheet of glass and having both surfaces of spherical shape with a

different positive constant refractive index at the respective surface as taught by McLaughlin et al. The motivation for doing so would have been to provide a collimator lens easy to produce and whose spherical aberration can be reduced at a low cost as suggested by McLaughlin et al. at col. 1, lines 15-26.

Ishibe also fails to teach the magnification ratio in a main scanning direction and a magnification in a sub-scanning direction are the same (claims 1, 5, 9, 13, 17), and the collimator lens having a positive refractive power (claims 2, 7, 11, 15, 19).

Narisawa discloses an optical scanning device comprising a collimator lens (12) made of glass, which converts the light beam into a parallel beam outputted toward a slit (21), the collimator lens having a power in the main scanning direction (col. 4, lines 3-5), a cylindrical lens (11), a polygon mirror (3), and scanning lenses (15) for focusing the light beam onto the scanned surface (19), wherein the image formation optical system has an image formation magnification along the main scanning direction equal to the image formation magnification along the sub-scanning direction (see Abstract) (col. 30-37) (col. 3, line 62 to col. 4, line 8).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Ishibe to have the image formation optical system has an image formation magnification along the main scanning direction equal to the image formation magnification along the sub-scanning direction as taught by Narisawa. The motivation for doing so would have been to minimize the defocus or dealignment of the light beam on the scanned surface as suggested by Narisawa.

With regard to claims 4, 8, 12, 16, 20, Ishibe further teaches the aperture stop (3) having an elliptic shape with a larger diameter (= 3.08 mm) in the main scanning direction and a shorter diameter (= 1.34 mm) in the sub-scanning direction (Table 1, col. 8, lines 50-52).

With regard to claim 17, Ishibe also teaches the scanning optical system including a cylinder lens (4) in which light beams passing therethrough, are transformed into linear shapes (col. 5, lines 50-58), a rotating polygon mirror (5), an f-theta lens (6), and a photosensitive drum (7).

Response to Arguments

3. Applicant's arguments filed 12/04/06 have been fully considered but they are not persuasive.

Applicant argued that "Table 1 of Ishibe shows radiuses of curvature of the first and second surfaces of the collimator lens 2 … in the main scanning direction and the sub-scanning direction" and that "Ishibe does not show exactly that the first and second surfaces of [the collimator lens 2] correspond to the first and second surfaces of the claimed invention", namely "the first surface of the claimed invention is a surface of the lens facing the light source, and the second surface of the claimed invention is a surface of the lens facing the slit". The examiner respectfully disagrees. Ishibe's Table 1 shows the radiuses of curvature of the first and second surfaces of the cylindrical lens in the main and the sub-scanning directions since the cylindrical lens is not spherical and the radiuses of curvature of the first and second surfaces of the of the collimator lens as a

whole with no specific difference between the main and the sub-scanning directions, implying that the collimator lens has spherical surfaces. Moreover, Ishibe's Table 1 clearly indicates the first surface of the collimator lens is facing the light source (for example, the "distance between light source and first surface of collimator lens" in Table 1 clearly indicates that the first surface of the collimator lens is facing the light source, while the opposite surface or second surface of the collimator lens is facing downstream toward the slit).

Applicant further stated that "the collimator is generally non-spherical" (emphasis added), which means that the collimator is not necessary non-spherical. Although Ishibe is silent regarding the shape of the collimator lens, the collimator lens cannot be interpreted as having non-spherical surfaces as Applicant had suggested.

Applicant further argued that the present invention does not "require that the glass contain at least a kind of monovalent cation" and that "McLaughlin teaches away from the present invention, and it would not be obvious to combine Ishibe and McLaughlin". The examiner respectfully disagrees. The present invention requires the first surface of the collimator lens to have a first positive constant refractive index and the second surface of the collimator lens to have a second positive constant refractive index. A one sheet of surface lens made of pure glass cannot have different constant refractive indexes, which would require the one sheet glass-lens be processed in a way to display different refractive indexes on the first and second surfaces. McLaughlin teaches the one sheet collimator lens being subjected to an ion-exchange process so as to produce the one sheet collimator lens having different positive constant refractive

indexes at the first and second surfaces, that clearly meets the claimed limitations in claims 1, 5, 9, 13 and 17. McLaughlin further teaches that the one sheet collimator lens is subjected to such ion-exchange process to produce a "highly efficient collimator lens with low spherical aberration and come" (McLaughlin, col. 9, lines 22-28) as a clear objective evidence of record for the motivation for doing so would have been combining Ishibe and McLaughlin.

Applicant also argued that Narisawa shows in several instances the magnification along the main scanning direction being made small and the magnification along the sub-scanning direction being made large. Nonetheless, Narisawa clearly teaches "the image formation optical system having an image formation magnification along the main scanning direction which is equal to or less than an image formation magnification along a sub-scanning direction" (see Abstract) (see also Narisawa, claims 1 and 8), which clearly meets the claimed limitation in claims 1, 5, 9, 13 and 17.

Applicant further argued that "the present invention utilizes a slit which limits a size of a beam selection of beams passing through a collimating lens" to imply that the magnification of the image forming system in the main and sub-scanning directions is being regulated by the shape of the slit as compared to Narisawa, which teaches the use of a convex spherical lens to reduce the beam width. However, it is noted that the relationship between the shape of the slit and the magnification status is not claimed. Furthermore, it is well known in the art that any of the pre-polygon and post-polygon optical systems can be utilized to obtain the desired magnification in the main and sub-

scanning directions. Therefore, the teaching of Narisawa is still read on the claimed limitation in claims 1, 5, 9, 13 and 17.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C. Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on M-F 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Luu can be reached on (571) 272-7663. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HAI PHAM
PRIMARY EXAMINER

March 2, 2007